INSTITUTE OF PUBLIC HEALTH
COLLAGE OF MEDICINE AND HEALTH SCIENCES
UNIVERSITY OF GONDAR

Prevalence of thinness, stunting and associated factors among adolescent school girls, Adwa town, Northern Ethiopia

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Acronyms and Abbreviations

ARI:–Acute Respiratory Infection

BMI: – Body Mass Index

CI: – Confidence Interval

Cm: - Centimeter

EDHS: – Ethiopian Demographic and Health Survey

FAO: – Food and Agriculture Organization

IDDS: – Individual Dietary Diversity Score

IUGR: – Intra Uterine Growth Restriction

IYCN: – Infant and Young Child Nutrition

Kg: – Kilogram

Km: - kilometer

LBW:–Low Birth Weight

OR:–Odds Ratio

SD:-Standard Deviation

SPSS:-Statistical Package for Social Science

SRS: - Simple Random Sampling

USAID:–United States Agency for International Development

WHO:–World Health Organization

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Abstract

Introduction: Despite the fact that adolescence is window of opportunity to break the intergenerational cycle of malnutrition and prepare nutritionally for a healthy adult life, they are the neglected age groups. Hence information regarding the nutritional status of adolescents is lacking specially including pubertal landmarks making intervention programs creating and implementation difficult.

Objective: To assess the prevalence of thinness, stunting and associated factors among adolescent school girls in Adwa town, Northern Ethiopia.

Methods: An institution based cross sectional study design was employed from March to April, 2014, at Adwa town schools. A total of 823 adolescent girl students were selected randomly from five schools. Data were collected using interviewer administered pretested semi-structured questionnaire and anthropometric measurements. Data were entered using EPI INFO version 3.5.3 satircal software and analyzed using SPSS version 16 and WHO Anthroplus software.

Results: The prevalence of thinness and stunting were 21.4% and 12.2% respectively. Age of adolescent[AOR (95% CI) =2.15(1.14,4.03)],enrolling in governmental school [AOR(95%CI)=2.89(1.20,6.91)], mother's educational status[AOR (95% CI) =2.34(1.14,4.80)], eating less than 3 meal per day[AOR (95% CI) =1.66(1.12,2.46)], having family size >5 [AOR(95% CI)= 2.53(1.66,3.86)] , unimproved source of drinking water [AOR (95% CI) =3.27(1.98,5.40)] were significantly associated with thinness among the adolescent girls. Family size >5 [AOR (95% CI)= 2.05(1.31,3.23)],unimproved source of drinking water [AOR(95% CI) =3.82(2.20,6.62)], and did not start menstruation [AOR (95% CI)= 2.80(1.75,4.48)] were significantly associated with stunting.

Conclusion: this study revealed that thinness and stunting are prevalent problems in the study area. Strategies to improve the nutritional status of girls should be given much attention to correct nutritional problems before conception to break the intergenerational cycle of malnutrition.

Key words: thinness, stunting, adolescent school girls, Adwa Town

1. Introduction

1.1 Statement of the problem

Adolescents constitute 20% of the world population and they are estimated to be 1.13 billion by the year 2025 and about 25% of the Ethiopian population are adolescents(1, 2). Adolescence is a period of rapid growth and development by which up to 45% of skeletal growth takes place and 15 to 25% of adult height is achieved(1, 3).In addition to these burdens poor dietary diversity, dietary inadequacies are more likely threats among adolescents because of erratic eating patterns and specific psycho-social factors(1, 4, 5).

Poor nutritional status of adolescent girls do have effect that pass through generations, malnourished adolescent girl enter pregnancy with poor nutrient store and give birth to low birth weight baby, intrauterine growth restricted baby that is more vulnerable to metabolic disorders in adult life(6). So adolescence period is a unique opportunity to break a range of vicious cycles of structural problems that are passed from one generation to the next generation, such as poverty, gender discrimination, violence, poor health and nutrition(1, 4).

In Ethiopia, chronic under nutrition is considered to be a major problem in adolescent girls. According to the review of results of Ethiopian demographic and health survey (EDHS) by united states agency international development (USAID) and infant and young child nutrition project(IYCN) 23% of adolescent girls with the age group of 13-19 years was stunted(5).

Despite the fact that adolescents are future mothers and need critical attention, they are the most neglected age groups (1, 4).The intergenerational cycle of malnutrition has to be broken by strategies to improve nutrition of adolescents. There is limited information about the nutritional status and associated factors in adolescent girls in Ethiopia especially including pubertal landmarks which is critical for creating strategies and interventions on these target groups. Therefore, this study will address the gap by assessing the nutritional status and associated factors of adolescent school girls in Adwa town.

1.2 Literature Review

Under nutrition and poor health from preventable causes disproportionately affect the Well-being of millions of people in the developing world. Various studies conducted on the prevalence of thinness and stunting and associated factors showed that, the prevalence of thinness and stunting is high in many countries and the factors predicting also differ from place to place.

1.2.1 Prevalence of stunting

Study done in Khagrachhari District, Bangladesh shows that 13.67% of the adolescent girls were severely stunted and 20.33% were moderately stunted(7). Another study done in rural areas of Bangladesh shows that 32% of the adolescent girls were stunted (8). According to different studies done in India the prevalence of stunting ranges from 11.7% to 34.2 % (9-12).

According to study done in Durban, South Africa 20% of the girls aged 14-18 years were stunted(13).

Studies conducted in Umuahia urban areas of Nigeria and Kenya shows that the prevalence of stunting was 57.8% and 12.1% respectively (14, 15).

According to the review of the EDHS result by USAID and IYCN, 23% of adolescent girls with the age group of 13-19 years was stunted(5). Study done in the rural communities of Tigray, reviled that under nutrition was common by which 26.5% of the adolescent girls were stunted (16).

1.2.2 Prevalence of thinness

Result of study done in rural areas of Bangladesh shows 26% of the adolescent girls were thin (8). According to different studies done in India the prevalence of thinness ranges from 28.2% to 43.4 % (10, 12, 17). According to study done in Srilanka 39.1% of the adolescent girls were undernourished (18).

Studies done in Kenya and Tunisia reported that the prevalence of thinness was 15.6% and 1.3% respectively (15, 19).According to the Study done on the rural communities of Tigray 58.3% of the adolescents girls were thin (16).

1.2.3 Factors associated with stunting, thinness of adolescent girls

Socio demographic factors

Previous studies done in different areas show that family size had positive association with the risk of under nutrition among adolescent girls (10, 20). study from Nigeria shows low maternal education was a major factor that contributes to stunting(21). Results from different studies reviled that economic status of the household had association with poor nutritional status of adolescent girls (7, 10, 20).

According to study in India Adolescent girls in the early adolescent were more stunted and thin as compared to late adolescents girls (22).Additionally Results from rural community of Tigray shows prevalence of thinness and stunting decreased as the age of the adolescent girl increased (16).According to different studies done in India, the prevalence of stunting and thinness were more prevalent in rural areas than urban areas(9, 12).

Study done in Delihi India shows that deficit in calorie intake was found to be 20-35 per cent in various age groups of adolescent girls from private schools and 55-64 per cent in case of girls from government schools (23).Additionally type of last school the adolescents enrolled was reported to have significant association with thinness on study from Jimma (20).

Reproductive factors

According to study done in Nigeria girls who reach menarche were significantly heavier and taller as compared to those adolescent girls in the pre menarche stage (24). Additionally a recent longitudinal study in Ethiopia found that food insecure girls had menarche one year later than their food secure peers and Stunted girls had menarche one year later than their non-stunted peers (25).

Medical history

According to study done in rural areas of Bangladesh morbidity in the last 2 weeks of data collection was significantly associated with being thin (8).

Dietary factors

Dietary diversity and meal pattern are more likely to affect nutritional status of adolescents. study done in Pakistan indicates that 79.51% of the respondents took breakfast regularly all days of the week which had an excellent bearing on their nutritional status and 82.8% of the respondents took lunch regularly in all days of the week and had better nutritional Status(26). Other study done in Ghana shows that most of the respondents who were normal, at risk of becoming overweight and those who were overweight did not skip meals often(27). Additionally Results of EDHS review also shows that three-quarters of the adolescent girls were consuming less than three meals a day (5).

Dietary diversity uses as proxy measure of micronutrient adequacy that in turn affects over all nutritional status. Monotonous diets based on starchy staples lack essential micronutrients and contribute to the burden of malnutrition because of the essential role played by micro nutrients in metabolic reactions inside the body (28).Study done in Sri Lanka shows that low dietary diversity was associated with adolescent under nutrition (18).

Lifestyle factors

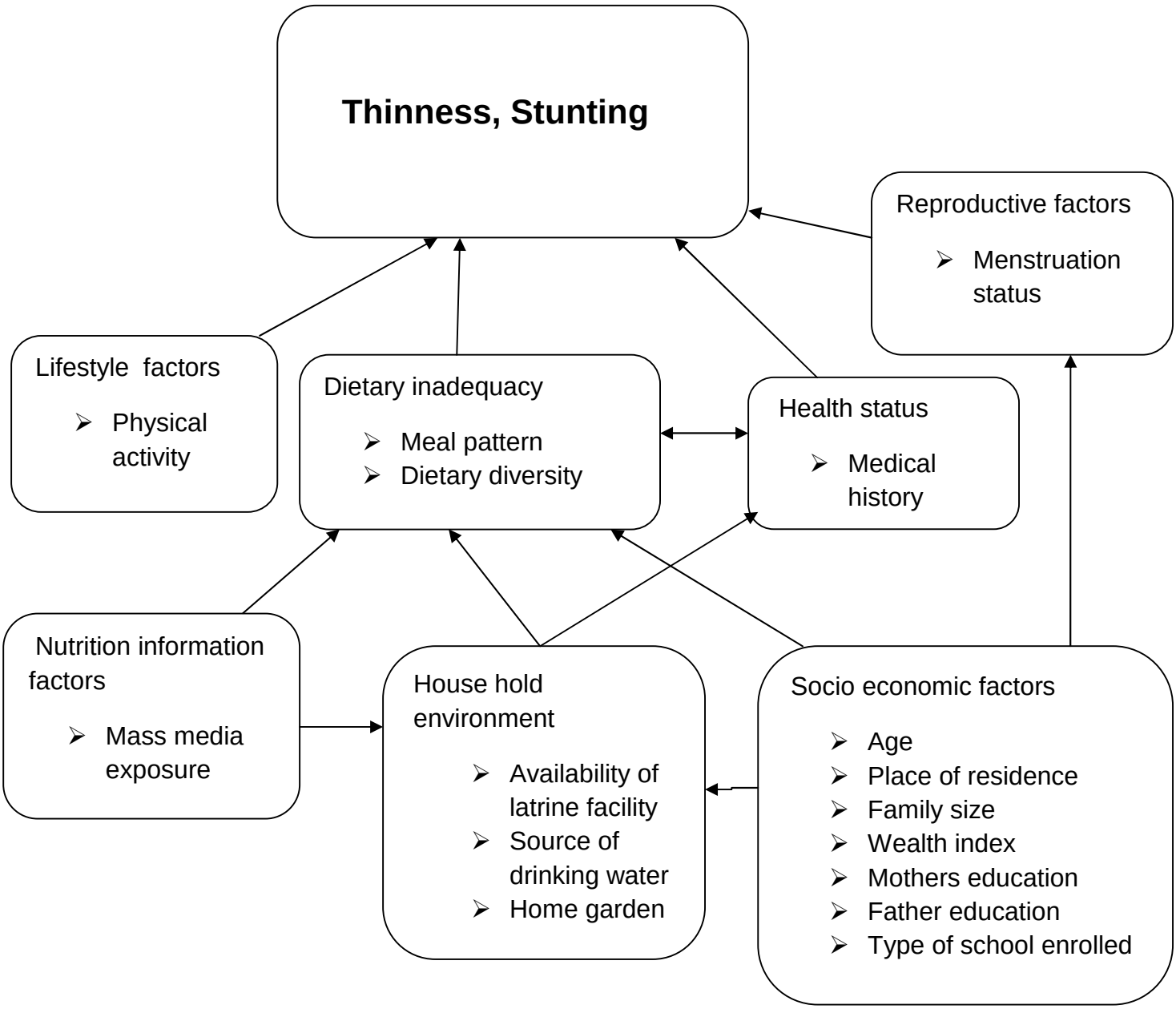
Physical activity can impose effect on nutritional status because if the energy output due to physical activity is greater than energy input, it causes negative energy balance leading to under nutrition. Study done in India, reveals that increased physical activity was contributory factor for poor nutritional status of respondents(17).

Household Environmental factors

Household environmental factors are known to have effect on nutritional status of adolescents because of unhealthy, unhygienic household environment is a source of infection that diminishes immunity and nutritional status. Result of study done in rural community of Tigray shows that lack of latrine facility was significantly associated with stunting and thinness. However availability of safe drinking water and home gardening were not associated with the nutritional status of the adolescents(16).

Nutrition relate variables

Nutrition relates factors are important for changing unhealthy nutritional behaviors and could contribute to better nutritional outcomes. Study in Bangladesh shows that nutritional awareness developed 43.33% through mass media such as Television, Radio and Newspaper, Friends and family members play a vital role to improve the nutritional awareness of the adolescents(7).



Source: Adopted from WHO discussion paper on adolescents, 2005 with some modifications

Figure 1: conceptual framework of stunting and thinness

1.3 Justification of the study

Nutritional deficiencies among adolescent girls do have devastating effects. Undernourished adolescent girls are more likely to give birth to undernourished infants, thus transmitting under nutrition to the future generation. Hence the adolescence period is the last intervention point to break the intergenerational cycle of malnutrition by improving the nutrition of adolescent girls prior to conception (1, 4).

Despite the fact that, Having adequate evidences and information on the prevalence of stunting and thinness and associated factors among adolescent girls do have paramount important for planning, initiating and implementing of intervention programs, information regarding the nutritional status of adolescents is lacking.

There are no research reports on adolescent nutritional status and determinant factors in Adwa town. Fortunately, the study will add up to the already available limited information on the magnitude of stunting and thinness and associated factors of adolescents at the national level and provide baseline information on the nutritional status of adolescent girls in Adwa town and helps policy makers to do informed decisions.

2. Objective

2.1 General objective

- To assess the Prevalence of thinness, stunting and associated factors among adolescent school girls, Adwa town, Northern Ethiopia

2.2 Specific objectives

- To determine the prevalence of thinness among adolescent school girls
- To determine the Prevalence of stunting among adolescent school girls
- To identify factors associated with thinness among adolescent school girls
- To identify factors associated with stunting among adolescent school girls

3. Methods and materials

3.1 Study design and period

An Institution based cross sectional study was conducted from March to April, 2014.

3.2 Study area

Adwa is located 935 Km from Addis Ababa in the central zone of Tigray. There are a total of 16 schools (primary school, high school, preparatory schools) in Adwa Town. Out of this 10 primary, 3 high schools, 2 preparatory schools are governmental schools and the rest one school (from KG to preparatory) is nongovernmental. In the academic year 2013/2014 there is 18812 students, of which 9012 are males and 9800 are females. The total number of adolescent girls from grade 4-12 is 5974 of which 5603 are from governmental and the rest 371 are from nongovernmental schools (32).

3.3 Source population

All adolescent girls in governmental and nongovernmental schools of Adwa Town

3.4 Study population

All regular adolescent girls attending grade 4-12 who were randomly selected by computer generated method in the randomly selected schools.

3.5 Inclusion and exclusion criteria

3.5.1 Inclusion criteria - All regular adolescent school girls who were available during data collection

3.5.2 Exclusion Criteria- Adolescent school girls who were seriously ill, unable to stand by them selves

3.6 variables of the study

3.6.1 Dependent variable

- Thinness (0=no , 1=yes)
- Stunting (0=no ,1=yes)

3.6.2 Independent variable

Socio demographic and economic variables

- Age
- Place of residence
- Wealth index
- Family size
- Maternal education
- Father education
- Type of school

Reproductive factor

- Menstruation status

Dietary factors

- Meal pattern
- Diet diversity

Health status

- Medical history

Lifestyle factors

- Physical activity

Household environmental factors

- Availability of home latrine
- Source of drinking water
- Availability of home garden

Nutrition relate factor

- Mass media exposure

3.7 Operational definition

Thinness- BMI-for-age < -2Z scores of the 2007 WHO reference (29)

Stunting- height-for-age < -2Z scores of the 2007 WHO reference (29)

Adolescents – individuals in the age group of 10-19 years of age (1).

Early adolescents- adolescents in the age range of 10-13 years

Middle adolescents- adolescents in the age range of 14-16 years

Late adolescents- adolescents in the age range of 17-19 years

Meal pattern - measure of whether they consume their meal regularly or skipping some times.

Diet diversity- the kind of food eaten by the adolescent girls.

Poor dietary diversity - individual dietary diversity score of below the median value (<4 food groups).

Good dietary diversity– individual dietary diversity score of the median and above the median values (≥ 4 food groups)

High mass media exposure- adolescent girls who had listened to radio or watched television or read newspaper/magazines at least once a week

Low mass media exposure- adolescent girls who had not listened to radio or watched television or read newspaper/magazines at least once a week

Improved source of water- includes tap water, public tap and protected well

Non-improved source of water-includes unprotected spring and unprotected well

3.8 Sample size determination

Sample size was determined using single population proportion formula by assuming prevalence of thinness (p= 58.3%), and prevalence of stunting 26.5% from previous study done among rural adolescent girls in Tigray (16), 95% confidence level and 5% degree of precision. the sample size was calculated as follow:-

By taking prevalence of thinness:-

$$n = \frac{(Z\alpha/2)2\ p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2\ 0.58(1-0.58)}{0.05^2} = 374$$

By taking prevalence of stunting:-

$$n = \frac{(Z\alpha/2)2\ p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2\ 0.265(1-0.265)}{0.05^2} = 300$$

Where: Z α/2 = critical value for normal distribution at 95% confidence level which equals to 1.96

P = prevalence of thinness, stunting from study in rural community of Tigray

d = margin of error

Taking the larger sample size (374) from the above calculation and multiplying by design effect of 2 due to the use of multistage sampling and adding 10% non response gives the final sample size of 823.

3.9 Sampling technique and procedure

The participants were selected by stratifying the total schools into governmental and nongovernmental schools. Then by using lottery method out of the total governmental schools 2 primary, 1 high schools and one preparatory school was selected and 1 nongovernmental school was included purposively. From the selected school adolescent girls were selected by using computer generated random number method. The diagrammatic presentation of the sampling procedure is listed below (figure 2).

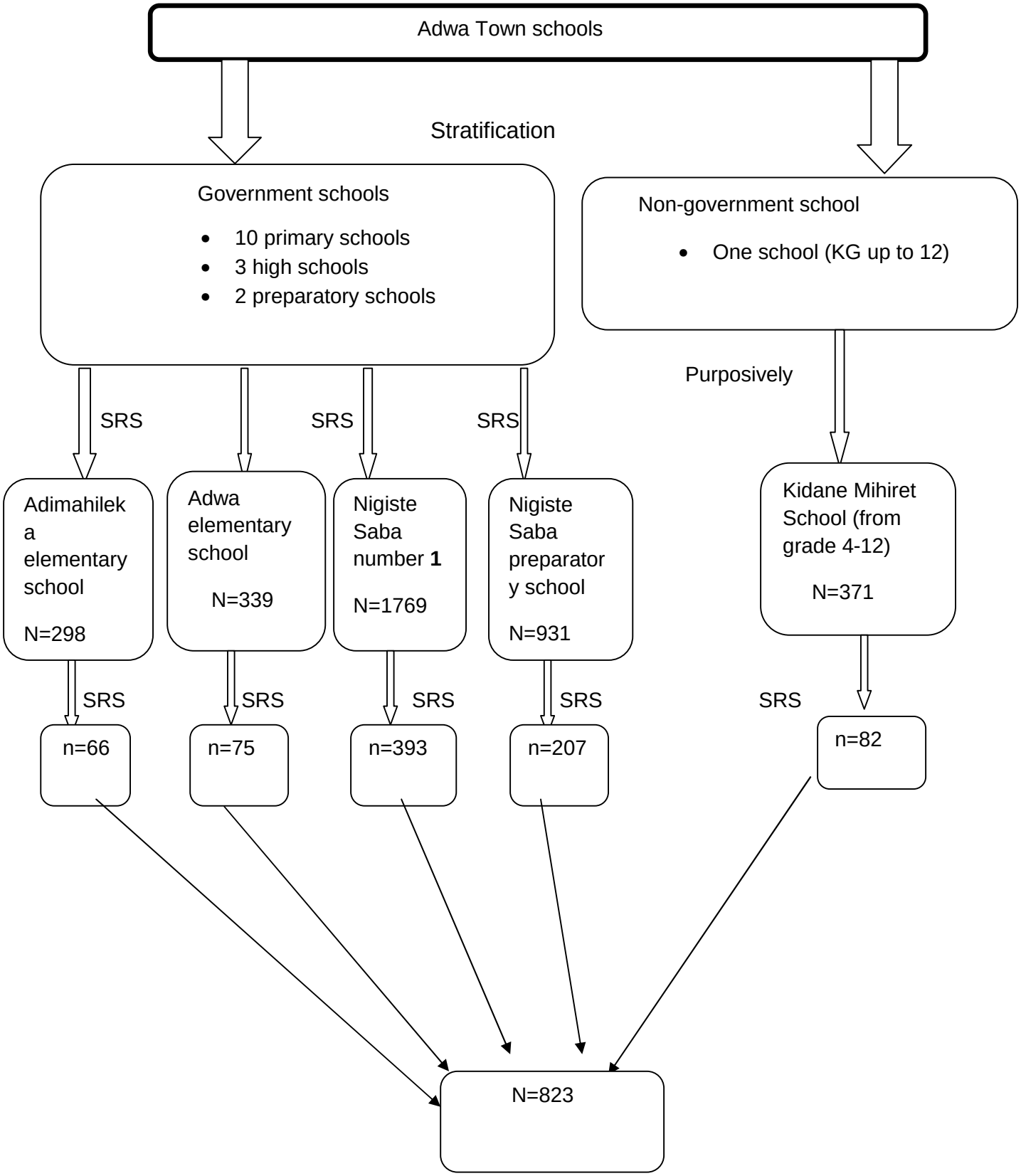


Figure 2: Diagrammatic presentation of sampling technique

3.10 Data collection instrument and procedures

Questionnaires were prepared by reviewing different literatures and for dietary diversity by using food and agriculture organization guideline (30) and for physical activity using the WHO prevention of non-communicable disease questionnaire (31) first in English and then it was translated to Tigrigna. Data were collected by interviewing the respondents through semi-structured questionnaire and by anthropometric measurements. Weight was measured to the nearest 0.1kg using calibrated digital weight scales in standing position with light cloths and bare foot. Height was measured to the nearest 0.1cm using height measuring stadiometer in standing position. Specifically trained data collector was used for anthropometric measurements. Two female BSc nurse supervisors and 6 female diploma nurse data collectors were recruited for the data collection process.

3.11 Data quality control

The questionnaire was pretested on 5% (41) adolescent school girls in Nigiste Saba elementary school. Data collectors and supervisors were trained for one day to have consensuses and same understanding of what is intended to be measured by each question in the questionnaire. Scales were carefully handled and periodically calibrated by placing standard calibration weights of 2 kg iron bars on the scale to ascertain accuracy. Close supervision was done throughout the data collection period. The completeness, accuracy and consistency of the collected data were checked daily by supervisors and principal investigator.

3.12 Data processing and analysis

Data were entered into EPI-INFO version 3.5.3 statical software and then transferred to SPSS version 16 statistical software for further analysis. Anthropometric measurements were converted to height-for- age z scores and BMI-for-age z scores using WHO Anthroplus software. Frequency was used to summarize descriptive statics of the data and tables and graphs were used for data presentation. Bivariate logistic regression analysis was used to check variables association with the dependent variable individually. Those variables with p-value of less than 0.2 were entered into multiple logistic regression models for further analysis and variables

having p-value of less than 0.05 were considered as significantly associated with the dependent variable. Odds ratios with 95% Confidence Interval (C.I) was used to see the association between dependent and independent variables.

3.13 Ethical consideration

Ethical clearance was obtained from the Ethical Review Board of Institute of Public Health, collage of medicine and health science, University of Gondar. Official letter from the Institute of Public Health was delivered to Adwa Town education office and then official letter from Adwa town education office was obtained and given to each selected schools. Brief explanation about the purpose of the study was given to each school directors. After getting permission from each school directors, individual assent and parental consent was obtained. Confidentiality was maintained throughout the study by all data collectors and principal investigator using code numbers than names and keeping questionnaires locked. Participants were counseled about proper nutrition.

3.14 Dissemination and utilization of results

Result of this study will be given to the Institute of Public Health, college of Medicine and health sciences, Gondar University. It also will be disseminated to the Adwa Town Health office, Adwa Town education office. Furthermore, the paper will be presented on workshops, seminars, and on other professional gatherings. The paper will also be published in a peer reviewed journals.

4. Results

Socio - demographic characteristics

From the total of 823 adolescent girls, 814 responded to the questionnaire making the response rate 98.9%. The mean age of the study participants was 15.27 years (15.27 ± 2.05 SD). Seven hundred thirty two (89.9%) of the respondents were from governmental schools and the remaining 82(10.1%) were from private school. Three hundred thirty three (40.9%) of the mother's of the study subjects were with no formal education followed by with secondary level of education 181(22.3%). From the total study subject's mother, housewives and government employee accounted for 549(67.4%) and 122(15%) respectively. Majority of the adolescent girl's father 220(27.0%) were with no formal education followed by primary level of education 213 (26.2%). Nearly one quarter 210 (25.8%) of respondents were found in the first quintile range of wealth index (Table1).

Table 1: Socio-demographic characteristics of adolescent school girls, Adwa town, Northern Ethiopia, 2014

Characteristics	Frequency	Percentage (%)
Age		
Early Adolescents	142	17.4
Middle Adolescents	453	55.7
Late Adolescent	219	26.9
Religion		
Orthodox	758	93.1
Muslim	52	6.4
Catholic	4	0.5
Place of Residence		
Urban	512	62.9
Rural	302	37.1
Father's education		
No formal education	220	27.0
Primary education	213	26.2
Secondary education	205	25.2
Collage and above	176	21.6
Father's occupation		
Government employee	248	30.5
Farmer	315	38.7
Daily labourer	42	5.2
Merchant	199	24.4
Other*	10	1.2
Mother's Education		
No formal education	333	40.9
Primary education	168	20.6
Secondary education	181	22.3
Collage and above	132	16.2
Family size		
≤ 5	446	54.8
> 5	368	45.2
Wealth index		
1st quintile	210	25.8
2nd quintile	200	24.6
3rd quintile	184	22.6
4th quintile	220	27.0

*includes-NGO workers, drivers

Dietary, Medical, lifestyle and reproductive factors

From the total 814 respondents, 543(66.7%) of them usually eat 3 and above meal per day. Four hundred twenty three (52.0%) of the respondents had good dietary diversity and the remaining 391(48.0%) had poor dietary diversity score.

From the total respondents, 97(11.9%) had history of illness in the past two weeks prior to the data collection. Regarding to physical activity of the respondents, 800(98.3%) and 561(68.9%) were involved continuously in walking for >30 minute per day and moderate intensity sport activities for ≥10 minutes continuously per day respectively. Six hundred three (74.1 %) of the respondents see their menstruation (Table 2).

Table 2: Dietary, medical, lifestyle and Reproductive characteristics of adolescent school girls, Adwa town, Northern Ethiopia, 2014

Characteristic		Frequency (n=814)	Percentage (%)
Dietary factors	Meal per day		
	< 3	271	33.3
	≥ 3	543	66.7
	Dietary diversity		
	Poor	391	48.0
	Good	423	52.0
Medical history	History of illness		
	Yes	97	11.9
	No	717	88.1
Physical activity	Vigorous work		
	Yes	253	31.1
	No	561	68.9
	Moderate work		
	Yes	361	44.3
	No	453	55.7
	Walk at least 30minute		
	Yes	800	98.3
	No	14	1.7
	Vigorous sport		
	Yes	372	45.7
	No	442	54.3
	Moderate sport		
	Yes	561	68.9
	No	253	31.1
Reproductive factors	Start menstruation		
	Yes	603	74.1
	No	211	25.9
	Age at menarche(n=603)		
	11-13	238	39.5
	14-15	274	45.4
	16-18	91	15.1

Household environmental factors

Seven hundred fifteen(87.8%) of the respondents uses drinking water from improved source. Four hundred fifty (55.3%) and 661(81.2%) of the study subjects reported that home gardening and home latrine were available in their home respectively (Figure 3).

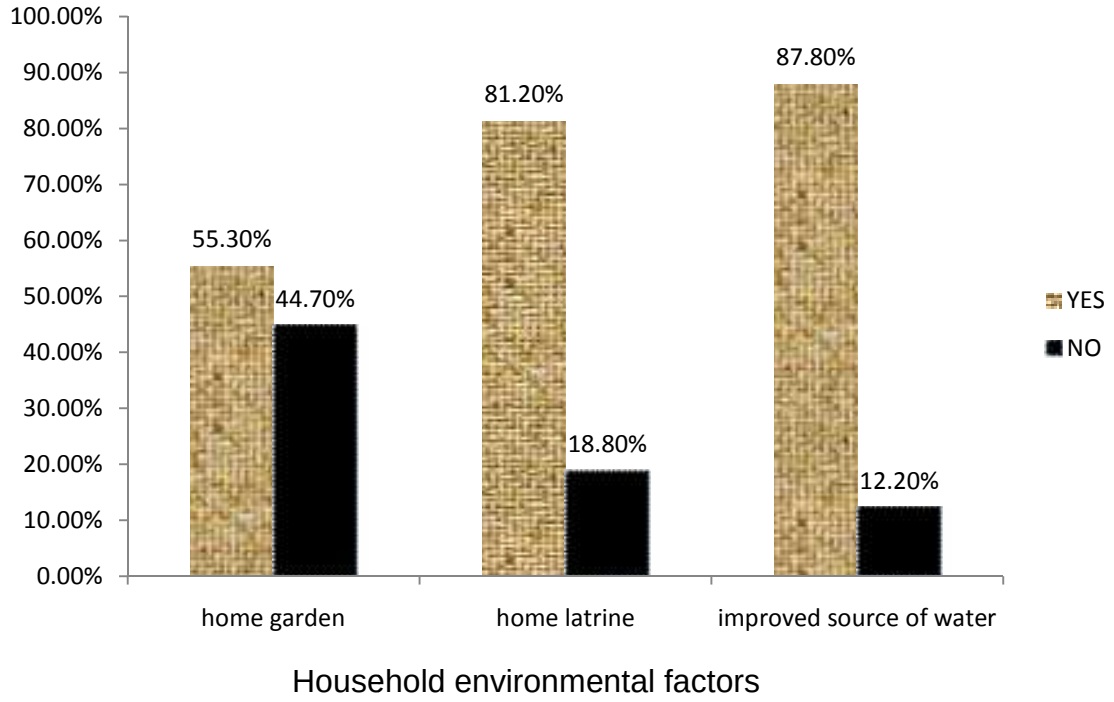


Figure 3: Household environmental factors among adolescent school girls of Adwa town, Northern Ethiopia, 2014

Nutrition relate factors

Of the total 814 respondents, 671 (82.4%) had high mass media exposure and the remaining 143(17.6%) had low mass media exposure. Five hundred sixty five (69.4%) of the respondents had information about adolescent nutrition and 249(30.6%) did not have information about adolescent nutrition.

Table 3: source of adolescent nutrition information among adolescent school girls, Adwa Town, Northern Ethiopia, 2014

Source of adolescent information		Frequency(n=565)	Percentage (%)
Mass media	yes	429	75.93
	no	136	24.07
Health worker	yes	320	56.64
	no	245	43.36
school	yes	151	26.73
	no	414	73.27

Prevalence of thinness, stunting among adolescent school girls of Adwa Town

The overall prevalence of thinness and stunting among adolescent school girls of Adwa Town was 21.4% (95%CI=18.5%, 24.2%) and 12.2 %(95%CI=9.9%, 14.4%) respectively. The school specific prevalence of thinness and stunting is described below (Figure 4).

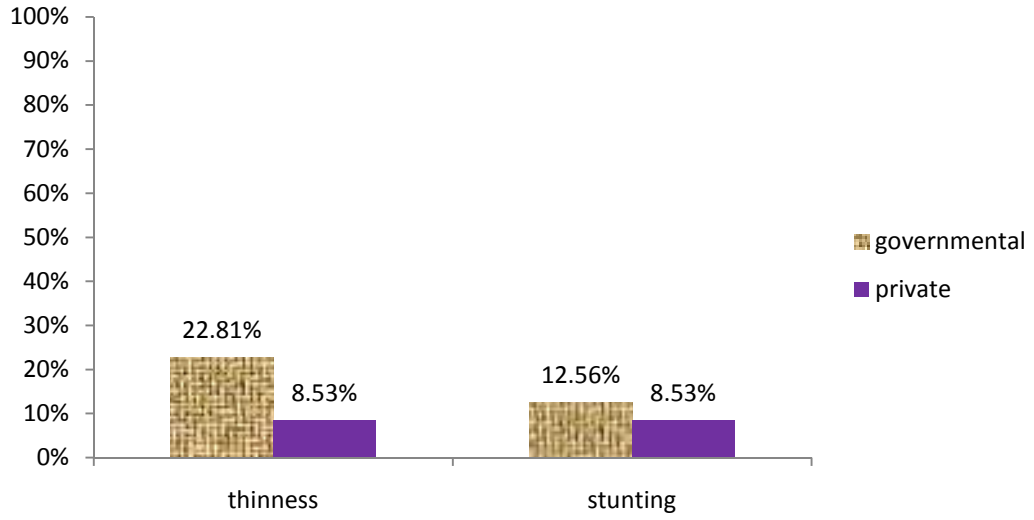


Figure 4: prevalence of thinness, stunting among governmental and private adolescent school girls of Adwa Town, Northern Ethiopia, 2014

Factors associated with thinness among adolescent school girls of Adwa Town

On the bivariate analysis age, place of residence, type of school, mother education status, Father Education status, meal per day, history of illness, availability of home garden, availability of home latrine, family size, source of drinking water, wealth index were identified to be associated with thinness. But only age, type of school, meal per day, mother education status, family size, source of drinking water were remained significantly associated with thinness in the multiple logistic regression analysis.

The odds of thinness was 2.15 times higher among adolescent girls in the early adolescent stage as compared to adolescent girls in the late adolescent stage [AOR (95% CI) =2.15(1.14,4.03)].

The odds of thinness were higher among adolescent girls enrolled in governmental school. Adolescent girls in governmental school were 2.89 times more likely to be thin as compared to adolescent girls from private school [AOR(95%CI)= 2.89(1.20,6.91)].

The odds of being thin was 1.66 times higher among adolescent girls who usually ate less than 3 meal per day compared to adolescent girls who usually ate 3 and above meal per day [AOR (95% CI) =1.66(1.12,2.46)].

Adolescent girls who were from family size of greater than five were about 2.53 times more likely to be thin compared to adolescent girls from family size of less than or equal to five[AOR(95% CI)= 2.53(1.66,3.86)].

Adolescent girls whose mothers had not taken formal education were 2.34 times more likely to be thin as compared to those whose mother completed college and above education[AOR (95% CI) =2.34(1.14,4.80)].

The odds of thinness was 3.27[AOR (95% CI) =3.27(1.98,5.40) times higher among adolescent girls who use water from unimproved source as compared to adolescent girls who use water from improved source.

Table 4: Bivariate and multivariate logistic regression of factors associated with thinness among adolescent school girls, Adwa town, Northern Ethiopia, 2014

characteristics	Thinness		COR(95%CI)	AOR(95%CI)
	Yes	No		
Age of adolescent				
Early	33(23.2%)	109(76.8%)	1.98(1.14,3.44)	2.15(1.14,4.03)*
Middle	112(24.7%)	341(75.3%)	2.15(1.37,3.35)	1.96(1.20,3.18)*
Late	29(13.2%)	190(86.8%)	1	1
Place of residence				
Urban	84(16.4%)	428(83.6%)	1	
Rural	90(29.8%)	212(70.2%)	2.16(1.54,3.03)	1.31(0.59,2.93)
Type of school				
Governmental	167(22.8%)	565(77.2%)	3.16(1.43,7.00)	2.89(1.20,6.91)*
Private	7(8.5%)	75(91.5%)	1	1
Education states of mother				
No formal	96(28.8%)	237(71.2%)	3.7(1.99,6.89)	2.34(1.14,4.80)*
Primary	37(22.0%)	131(78.0%)	2.58(1.31,5.09)	1.78(0.86,3.66)
Secondary	28(15.5%)	153(84.5%)	1.67(0.83,3.374)	1.29(0.61,2.73)
Collage and above	13(9.8%)	119(90.2%)	1	1
Meal per day				
<3 meal/day	80(29.5%)	191(70.5%)	2.00(1.42,2.81)	1.66(1.12,2.46)*
≥3 meal/day	94(17.3%)	449(82.7%)	1	1
History of illness				
Yes	31(32.0%)	66(68.0%)	1.88(1.18,3.00)	1.40(0.83,2.35)
No	143(19.9%)	574(80.1%)	1	1
Home latrine				
Yes	111(16.8%)	550(83.2%)	1	1
No	63(41.2%)	90(58.8%)	3.46(2.36,5.07)	1.54(0.91,2.59)
Family size				
≤5	59(13.2%)	387(86.8%)	1	1
>5	115(31.2%)	253(68.8%)	2.98(2.09,4.23)	2.53(1.66,3.86)*
Source of drinking water				
Improved	126(17.6%)	589(82.4%)	1	1
Non improved	48(48.5%)	51(51.5%)	4.4(2.83,6.82)	3.27(1.98,5.40)*
Wealth quintile				
1 quintile	41(19.5%)	169(80.5%)	1.02(0.63,1.66)	0.95(0.54,1.70)
2 quintile	55(27.5%)	145(72.5%)	1.60(1.01,2.54)	1.15(0.66,1.99)
3 quintile	36(19.6%)	148(80.4%)	1.03(0.62,1.69)	0.95(0.54,1.66)
4 quintile	42(19.1%)	178(80.9%)	1	1

Method used: backward LR

*=p value <0.05

Factors associated with stunting among adolescent school girls of Adwa Town

On the bivariate analysis, age, meal per day, availability of home latrine, mass media exposure, family size, source of drinking water, menstruation status were identified to be associated with stunting. But only family size, source of drinking water and menstruation status were remained significantly associated with stunting in the multiple logistic regression analysis.

Adolescent girls who were from family size of greater than five were 2.05 times more likely to be stunted as compared to adolescent girls from family size of less than or equal to five [AOR(95% CI)= 2.05(1.31,3.23)].

Adolescent girls who did not start menstruation were 2.80 times more likely to be stunted as compared to adolescent girls who start menstruation [AOR (95% CI)= 2.80(1.75,4.48)].

The odds of stunting was 3.82 [AOR (95% CI) =3.82(2.20,6.62)] times higher among adolescent girls who use water from unimproved source as compared to adolescent girls who use water from improved source (Table 5).

Table 5: Bivariate and multivariate logistic regression of factors associated with stunting among adolescent school girls, Adwa town, Northern Ethiopia, 2014

characteristics	stunting		COR(95%CI)	AOR(95%CI)
	Yes	No		
Age of adolescent				
Early	28(19.7%)	114(80.3%)	2.91(1.53,5.56)	1.62(0.64,4.09)
Middle	54(11.9%)	399(88.1%)	1.60(0.90,2.84)	1.25(0.68,2.30)
Late	17(7.8%)	202(92.2%)	1	
Type of school				
Governmental	92(12.6%)	640(87.4%)	1.54(0.68,3.44)	
private	7(8.5%)	75(91.5%)	1	
Meal per day				
<3 meal/day	45(16.6%)	226(83.4%)	1.8(1.17,2.76)	1.44(0.92,2.25)
≥3 meal/day	54(9.9%)	489(90.1%)	1	
Family size				
≤5	35(7.8%)	411(92.2%)	1	1
>5	64(17.4%)	304(82.6%)	2.47(1.59,3.83)	2.05(1.31,3.23)*
Source of drinking water				
Improved	73(10.2%)	642(89.8%)	1	1
Non improved	26(26.3%)	73(73.7%)	3.13(1.88,5.21)	3.82(2.20,6.62)*
Home latrine				
Yes	71(10.7%)	590(89.3%)	1	1
No	28(18.3%)	125(81.7%)	1.86(1.15,3.00)	0.97(0.50,1.85)
Mass media exposure				
High	74(11.0%)	597(89.0%)	1	
low	25(17.5%)	118(82.5%)	1.70(1.04,2.80)	
Menstruation status				
Yes	57(9.5%)	546(90.5%)	1	1
No	42(19.9%)	169(80.1%)	2.38(1.54,3.67)	2.80(1.75,4.48)*

Method used: backward LR

*=p value <0.05

5. Discussion

The prevalence of thinness among the study participants was 21.4% .This prevalence is higher when compared to studies done in Kenya (15.6%), Tunisia (1.3%), and 10% in Ghana (15,19, 27).The possible explanation for this difference could be due to difference in the study group since unlike this study which assesses the early, middle, late stages of adolescent, study done in Tunisia considered adolescents in the middle and late stages which are less likely to be thin because of less possibility of height growth than early adolescents. The variation could also be due to time zone, socioeconomic and cultural difference in dietary habit and care practices.

The prevalence in this study is lower than the findings of studies done in Bangladish, Tamilnadu , west Bengal, Tigray by which 26%,28.2,40.94% and 58.3%of the adolescent girls were thin respectively(8,10,12,16).This difference might be due to urban rural difference since unlike this study which includes adolescent school girls from both urban and rural setting, the above studies considers adolescent girls only from rural settings which are more likely to involves in activities which need more energy expenditure.

The prevalence of stunting among the study participants was 12.2%.This finding is lower than the findings of studies done in Westbangel, Tamilnadu, Umuahia Nigeria, and Tigray by which 34.2%,19.2%,57.8% and 26.5% of the adolescents were stunted respectively(12,10,14,16).This difference might be due to the difference in the study setting by which unlike this study which included urban and rural adolescent girls, the above studies were done in rural areas by which unhealthy household environmental factors are more likely to be common than the urban setting. The difference could also be due to variation in time zone.

The likelihood of being thin was higher among adolescents in the early and middle stage of adolescence than late stage of adolescence. Adolescent girls in the early stage of adolescence were 2.15 times more likely to be thin as compared to adolescent girls in the late stage of adolescence. This finding is similar with findings from India, Tigray (22,16).This might be due to the increased growth sprute during the early and middle adolescent stage than late adolescent with sudden increase of height in the early and middle adolescents than late adolescents.

Type of school was significantly associated with thinness in this study. Adolescent girls enrolled in governmental school were 2.89 times more likely to be thin as compared to adolescent girls from private school.This finding is in line with findings from Delihi, Jimma (23,20).This might be due to differing school environment by which governmental school environment is less hygienic than the private school predispose to infection that leads to have poor nutritional status. Other reason could be governmental school students includes those who came from rural areas which involve in higher energy expenditure activities but private school students are only from urban areas. This finding also could be due to poor economic status of government school adolescent girls' parents.

Adolescent girls who usually eat less than 3 meals per day are 1.66 times more likely to be thin as compared to adolescent girls who usually eat 3 and above meal per day.This finding is in line with finding from Pakistan, Ghana (26, 27).This might be due to skipping of meals leads to inadequate dietary intake. Adolescence period do have fastest growth and the nutritional requirements are increased to promote this growth. So, in addition to the increased nutritional demand during adolescent period skipping of meals leads to being thin.

Adolescent girls who were from family size of greater than five were about 2.53 times more likely to be thin as compared to adolescent girls from family size of less than or equal to five.This finding is in line with findings from Tamiludu, Delihi, Assam, Jimma(10,23,11,20).This might be due to having more family member could lead to sharing of the available food for the large household members causing inadequate

consumption of food leading to be thin. This finding also could be due to increased family size mostly occurring in uneducated parents who are more likely to accept and practice food taboos affecting mostly females.

Adolescent girls whose mothersdid not have formal education were 2.34 times more likely to be thin as compared to those whose mothers are completed college and above education. this is in line with study done in Assam(11). This is due to the fact that if the level of education of the mother is low, her decision making and her contribution to the total family income will be low. This places the family at risk of not meeting their need including nutritional needs.

Adolescents who use drinking water from unimproved source are 3.27 times more likely to be thin as compared to adolescent girls who use drinking water from improved source. This might be due to the fact that impure water is vehicle for intestinal parasites which leads to loss of appetite leading to poor nutritional status.

Family size was significantly associated with the risk of being stunted. Adolescent girls who were from family size of greater than five were 2.05 times more likely to be stunted as compared to adolescent girls from family size of less than or equal to five.This finding is in-line with the findings from Tamilnadu, Assam, Jimma(10,11,20).This might be due to sharing of the available food for the large household members causing inadequate consumption of food leading to be stunted.

Adolescent girls who did not start menstruation were 2.80 times more likely to be stunted as compared to adolescent girls who start menstruation.This is in line with the findings of studies done in Kenya, Nigeria (15,24).This might be explained by the fact that starting menstruation coincides with the adolescent growth spurt. Delay in menstruation in stunted adolescents shows the opportunity for catch-up growth as stunting delay menarche.

Another factor significantly associated with being stunted was source of drinking water. The odds of stunting were 3.82 times higher among adolescent girls who use water from unimproved source as compared to adolescent girls who use water from improved source. This might be due to repeated infection causing depressed immunity and making the severity and duration of disease more sever contributing to poor nutritional status of the adolescents.

The result of this study helps for understanding of the magnitude of the problem in the area. Programs should be implemented to decrease this problem at all level to achieve the strategic objective 1 of the new national nutrition program. As results from different study shows micronutrient supplementation for adolescent girls should be provided to improve their nutritional status.

6. Strength and limitation of the study

Strength of the study:-

The study uses dietary diversity as proxy measure of micronutrient adequacy.

Limitation of the study:-

The study doesn't assess the socio cultural dimension (food taboos) that can affect nutritional status of the adolescent girls. The study also shares the limitation of the cross sectional study.

7. Conclusion

The data presented here shows that thinness and stunting are prevalent problems in the study area. Age of the respondent, type of school enrolled, meal eaten per day, Education status of mother, source of drinking water, family size were significantly associated with thinness among the respondents. Menstruation status, family size, source of drinking water was significantly associated with stunting among respondents.

8. Recommendation

To policy makers

- Strategies and programs addressing the nutritional status of adolescent girls are needed to put in to practice in order to break the intergenerational cycle of under nutrition by preparing adolescent nutritionally before conception

To Adwa Town health office and health extension workers

- Shall give health education about unhealthy environment factors and its impact on health and nutrition to the community
- Shall create awareness on the effects of increased family size on nutritional status of adolescents

To Adwa Town education office and schools

- Shall create and implement regular school health and nutrition education programs mainly in collaboration with the health office to create awareness on effects of unhealthy environmental factors, skipping of meals
- Shall encourage female education which may improve healthcare-seeking behavior and the use of health services

To parents

- Shall develop the habit of serving adequate food on time to their children.
- Shall limit the number of children they should have in line with their ability to give care appropriately.

To adolescent girls

- Shall eat their meal regularly

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32. Adwa town health office

Annexes

Annexes I. participant information sheet and consent form

My Name is----------. I am working as a data collector for the study being conducted in this school on the assessment of stunting and thinness and determinant factors among adolescent girls by Tsgehana G/gyorgis, who is studing for her master's degree at Gondar University, collage of medicine and health sciences,institute of public health. I kindly request you to lend me your attention to explain you about the study.

The study title:

Prevalence of thinness, stunting and associated factors among adolescent school girls, Adwa town, Northern Ethiopia

Purpose of the study:

The findings of this study will be used to identify the magnitude of thinness and stunting and investigate the main factors associated with these nutritional problems among adolescent girls in Adwa town.the result of this study will contribute evidence and input for the woreda as well as Zonal government health office and other food and nutrition related governmental organizations to address these nutritional problems and improve the nutritional status of adolescent girls .

Procedure and duration:

You are selected randomly and we are inviting you to take part in the study. Your participation will help us to assess magnitude of thinness and stunting and associated factors among adolescent school girls. We are going to ask you questions and measure your weight and height. Your honest answers are very useful to our study. The interview will take 20-25 minutes,so kindly request you to spareme this time for the interview. We will like to appreciate your help in responding to these questions.

Risks and benefits:

The risk of participiating in this study is very minimal, but only taking 20-25 minutes from your time. There would not be direct payment for participating in this study. But the findings from this research may reveal important information for the woreda health office and government planner.

Confidenentiality:

The information you will provide Us will be confidential. There will be no information that will identify in particular. The findings of the study will be general for the study community and will not reflect any thing particularly of individual persons. The questinniare will be coded to exclude showing names.

Rights:

Participation for this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate,you have the right to withdraw from the study at any time and this will not label you for any loss of benefits which you otherwise are entitled.

Contact address:

If there are any questions or enquires about the study or procedures, please contact by this address at any time.

Principal investigator:Tsgehana G/gyorgis, Mobile phone 0914764289

Advisors: Dr. Takele Tadesse Mobile phone 0920256715

Mrs. Azeb Atenafu Mobile phone 0918774536

Consent statement to be filled by participants

It read/was read to me the participant information sheet. I have clearly understood the purpose of the research,the procedures, the risks and benefites, issues of confidentiality,the right of participation. I have been given the opportunity to ask any questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time. I have agreed to participate in the study.

A. Yes……. B. No……

Signiture of the participant---------- Signiture of data collector----------

Consent statement to be filled by parent

It read/was read to me the participant information sheet. I have clearly understood the purpose of the research,the procedures, the risks and benefites, issues of confidentiality,the right of participation. I was informed that my daughter have the right to withdraw from the study at any time. I have agreed my daughter to participate in the study.

A. Yes……. B. No……

Signiture of the participant's parent---------- Signiture of data collector----------

Thank you!!

Annex II. English version Questionnaire

Code number of the participant_____

Name of the school_____

S.NO	Question	Response	Remark
	1. Socio demographic characteristics		
101	How old are you?	…….years	
102	What is your grade?	…….	
103	What is your religion?	1.orthodox 2. Muslim 3. catholic 4. Others (specify)…….	
104	Place of Residence	1.Urban 2.Rural	
105	Educational status of father	1.Illiterate 2.Read and write 3.Primary school 4.Secondary school 5.College and above	
106	Occupation of father	1. Government employee 2. Farmer 3.Daily labourer 4.Merchant 5. Others (specify)…….	
107	Education status of mother	1.Illiterate 2.Read and write 3Primary school 4.Secondary school 5.College and above	
108	Occupation of mother	1.Housewife 2.Government employee 3.Daily labour 4.Merchant 5. Other (specify)…….	
109	Family size	.....	
110	Type of school	1.Governmental 2. private	

Wealth index			
111	Does your house hold have -Electricity - A functional radio? - A television? - A mobile telephone? -A refrigerator? - A bed with cotton/sponge/ spring mattress? -chair? -table? - Bicycle - car	 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.yes 2.No 1.Yes 2.No	
112	Main material of the floor of house?	1. soil 2. wood planks 3. cement 4. ceramic tiles	
113	Main material of roof of the house?	1. Thatch/Mud 2. corrugated iron/metal 3. cement	
114	Do your household have any agricultural land?	1. yes 2. No	If no skip to 116
115	How much is your household's Annual product in kuntal?	..... Kuntal	
116	How many of the following animals does your household own?(if none put zero) Milk cows or oxen? Horse, donkey or mule? Goats? Sheep? Chickens? Beehives?	 Milk cows or oxen..... Horse, donkey or mule..... Goats..... Sheep..... Chickens..... Beehives.....	
2. Meal pattern			
201	Usually How many times did you eat your meal per day?	1.<3 meals/day 2.≥3 meals/day	
202	During the previous week, did you skip any regular meals any day, That is, breakfast, lunch or dinner?	1.yes 2.No	If no skip to 205

203	What were the reasons you had to Skip regular meals on some days during the last weeks?	Shortage of food.....1.yes 2.No Lack of appetite..... 1.yes 2.No Sickness .....1.yes 2.No To lose weight.....1. yes 2.No	
204	How many times did you skip the regular meals in the previous week?	..... times	
205	From the children who is first served?	1. Female 2. Male 3. Together	
206	What type of food do you mostly eat?	1. Left over 2. Fresh food	

3. Dietary Diversity

Please describe the foods (meals and snacks) that the respondent ate yesterday during the day and night, whether at home or outside the home.

breakfast	snack	lunch	snack	dinner	snack

When the respondent recall is complete, For any food groups not mentioned, ask the respondent if a food item from this group was consumed

	Question	Examples	Yes=1 No=0
301	starchy staple	corn/maize, rice, wheat, sorghum, teff, millet	
302	Dark green leafy vegetables	dark green/leafy vegetables like, spinach,	
303	vitamin A rich fruits and vegetables	pumpkin, carrots, or sweet potatoes, red sweet pepper, mango, papaya	
304	other fruits and vegetables	vegetables (e.g. tomato, onion, garlic, cabbage, lettuce	

		fruits like apple, avocado, banana, lemon, grapes	
305	eat organ meat	liver, kidney, heart or other organ meats or blood-based foods	
306	flesh meat	beef, pork, goat, chicken, or other birds, fish	
307	eggs	chicken, guinea fowl or other bird egg	
308	legumes/ nuts	beans, peas, lentils, nuts, seeds or foods made from these	
309	milk and milk products	milk, cheese, yogurt or other milk products	
4.Medical history			
401	Did you suffer from any diseases in the last two weeks?	1. Yes 2. No	If 2 skip to 501
402	what were the diseases you Had in the last two weeks?	Respiratory tract infection....1.yes 2.No Diarrhea/vomiting…..1.yes 2.No Tonsil……..1.yes 2.No Others ……1.yes 2.no	
5. Physical Activity			
501	Do you engage in work that involve vigorous-intensity activity(carrying or lifting Heavy loads, digging or construction work) besides your education?	1.yes 2.no	If 2 skip to 504
502	In a typical week, on how many days do you involve vigorous-intensity activity beside your education ?	Number of days.....	
503	How much time do you spend doing vigorous-intensity activity on a typical day?	Hour: Minute.....	
504	Do you engage in work that involves moderate intensity activity (carrying light loads) besides your education?	1.yes 2.no	If 2 skip to 507
505	In a typical week, on how many days do you involve moderate intensity	Number of days.....	

	activity beside your education?		
506	How much time do you spend doing moderate intensity activity on a typical day?	Hour: Minute.....	
507	Do you walk or use a bicycle for at least 30 Minutes continuously to get to and from places?	1.yes 2.no	If 2 skip to 510
508	In a typical week, on how many days do you walk or bicycle for at least 30 minutes continuously to get to and from places?	Number of days.....	
509	How much time do you spend walking or bicycling for travel on a typical day?	Hour: Minute.....	
510	Do you do any vigorous-intensity sports activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously?	1.yes 2.no	If 2 skip to 513
511	In a typical week, on how many days do you do vigorous intensity sports, fitness or recreational (leisure) activities?	Number of days	
512	How much time do you spend doing vigorous-intensity sports, on a typical day?	Hours: minutes .....:.....	
513	Do you do any moderate-intensity sports, that cause a small increase in breathing or heart rate [cycling, swimming, volleyball] for at least 10 minutes continuously?	1.yes 2.no	If 2 skip to 516
514	In a typical week, on how many days do you do moderate intensity Sports, fitness or recreational (leisure) activities?	Number of days.....	
515	How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?	Hours:minute.....	
516	How much time do you usually spend sitting when you are reading,	Hours:minute	

	watching movies on a Typical day?		
6. Household environment characteristics			
601	Where do you get water for drinking?	1.tap water 2.public tap 3. protected well 4. unprotected spring 5.unprotected well	
602	Do you do anything to the water to make it safer for drinking	1. Yes 2. No 3. Don't know	
603	Do you have home gardening (fruits and/or vegetables)?	1. Yes 2. No	If no skip to 605
604	For what purpose do you grow the vegetable and/or fruits?	1.For sale 2.own consumption 3.For sale and home consumption	
605	Do you have toilet in your home?	1. Yes 2. no	If no skip to 607
606	What kind of toilet facility do your households own?	1. Flush toilet 2. Pit toilet with slub 3.pit toilet without slub 4. Other(specify	
607	Where do you use toilet?	1. Open field 2. Public toilet	
608	In your school What kind of toilet do you have?	1. Flush toilet 2. Pit toilet 3. no toilet/open field	
7. Health and nutrition information characteristics			
701	Do you attend mass media?	1.Yes 2.No	If no skip to 704
702	How often in a week do you attend mass media?	1. Radio …… 2. Television …… 3. Newspaper …… 4. magazines ……	
704	Did you get information on adolescent nutrition?	1.Yes 2.No	If No skip to 801
705	From where did you get adolescent nutrition information?	Schools……..…1. yes 2.no Mass media……1.yes 2. no Health Worker..... 1.yes 2.NO	

8. Menstruation history			
801	Have you begin menstruation	1.yes 2. no	If no skip to 901
802	At what age did you see your first menstruation?	..... year	
9.Anthropometric Measurement			
901	Height	…… Cm	
902	weight	…… kg	

Thank you Very Much**!!!**

Name of data collector: ----------

Signature ----------

Annex III: Tigrigna version information sheet and consent form

ስመይ ---------- ይበሃል። ነዚ ቓለ-መሕትት ካብ ተሳተፍቲ ተምሃሮ ንምእካብ በተማራማሪት ወ/ሪት ፅጌሃና ገ/ጊዮርግስ ዝተበሃለት ናይ ጎንደር ዩኒቨርስቲ ተምሃሪት ዝተመደብኩ እየ።

ናይ መፅናዕቲ ርእሲ:-

ኣብ ኣድዋ ከተማ ዝርከባ ጎራዙ ናይ ስነ- ምግቢ ሽግራትን ናይ ስነ-ምግቢ ኩነታት ፅዕንቶ ዝፈጥሩ ነገራትን ፈሊካ ምፍላጥ

ናይዚ ምርምር መፅናዕቲ ዋና ዓላማ :-

ናይ እዚ ቓለ-መሕትት ዋና ዓላማ ኣድዋ ከተማ ኣብ ዘለዉ ትምህርቲ ቤታት ኣብ ዝርከባ ጎራዙ ተምሃሮ ናይ ስነ- ምግቢ ኩነታተንን ምስ ናይ ስነ-ምግቢ ኩነታት ዝተሓሐዙ ነገራትን ሓበሬታ ንምእካብ እየ። እዚ ናይ ምርምር መፅናዕቲ ኣብ ጎራዙ ምስ ናይ ስነ-ምግቢ ኩነታት ዝተሓሐዙ ናይ ጥዕና ሽግራት ፈሊካ ንምፍላጥ፤ንምክልካልን ንምቁጽጻርን ጠቓሚ ይኸዉን።

ኣኪያይዳን ዝወሰዶ ግዜን:-

ዝተመረፅኪ ብዕጫ ኮይኑ ተሳትፎኪ ናይ ስነ- ምግቢ ኩነታተንን ምስ ናይ ስነ-ምግቢ ኩነታት ዝተሓሐዙ ነገራትን ሓበሬታ ንምእካብ ዝዓዘዘ ግደ ኣለዎ። ን 20-25 ደቓይቕ ዝኣክል ቓለ-መሕትት ነታ ጎርዞ ክገብረላ እዩ፤ ብምቕፃል ድማ ቕመታን ክብደታን ክልካዕ እዩ።

ኪጋጥም ዝክእል ሽግርን ጥቅምታት:-

እቲ መጠይቅ ንምምላእን ናይ ቁመትን ክብደትን ዓቕን ንምዉሳድን ካብ 20-25 ደቂቃ ክወድእ ይክእል እዩ:: ኣብዚ ምርምር ስለዝተሳተፍኪ ዝክፈለኪ ክፍያ የለን ነገር ግን ኣብ መጨረሻ እቲ መፅናዕቲ መሰረት ብምግባር ንጎራዙን ብቀጥታ ይኹን ብተዘዋዋሪ ናይ ሰዉነት፤ ናይ ኣመጋግባ ስርዓትን ናይ ጥዕና ኩነታትን ኣብ ምፍላጥ ጥቅሚ ክህልዎ እዩ።ስለዙይ ናትኪ ኣብዚ መፅናዕቲ ምስታፍ ናይቲ ሽግር ስፍሓት ንምፍላጥን እዞም ሽግራት ኣብ ምፍታሕ ዝህሉ ምምሕያሽ ጠቃሚ እታዎት ክኮን እዩ::

ሚሽጢራዊነት :-

ካብዚ መፅናዕቲ ዝተሰብሰበ ሓበሬታ ሚሽጥሩ ዝተሓለወ እዩ:: ስለ ናይ ባዕልኪ ዝተሰብሰቡ ሓበሬታ ሹምኪ ኣይፀሓፍን ዝሃብክዮ ቕመትን ክብደትን እዉን ብምሽጥር ክተሓዝ እዩ:: ውፅኢት እዚ መፅናዕቲ ዝግለፅ ብሓፈሻ እንበር ብውልቂ ኣይኮነን።

ኣብዚ መፅናዕቲ ናይ ዘይምስታፍ ወይም ናይ ምቁራፅ መሰል :- ኣብዚ መፅናዕቲ ምስታፍ ብድሌት ዝተመሰረተ እዩ ማለትም- ኣብዚ መፅናዕቲ ናይ ምስታፍ ይኹን ዘይምስታፍ ሙሉእ መሰል ኣለኪ:: ኣይሳተፍን ስለዝበልኪ ዝቅነሰኪ ነገር የለን።

ክትረክብዎም ትክእሉ ሰባት፡ ብዛዕባ እዚ መፅናዕቲ ዝኮነ ጥያቄ ተህልይኩም በዚ ዝስዕብ ኣድራሻ ክትጥይቁ ትክእሉ።

ተማራማሪት:, ፅጌሃና ገ/ጊዮርግስ ቁፅሪ ስልኪ 0914764289

ኣማኸርቲ: ዶ/ር ታከለ ታደሰ ቁፅሪ ስልኪ 0920256715

ወ/ሮ ኣዜብ ኣጥናፉ ቁፅሪ ስልኪ 0918774536

ብተሳተፍቲ ዝምላእ ናይ ስምምዕነት ፎርሚ

ብዛዕባ እዚ መፅናዕቲ ሓበሬታ ኣብዞም ዝስዕቡ ነጥብታት ማለት እዉን ናይዚ መፅናዕቲ ዋና ዓላማ፣ኣኪያይዳን ዝወስዶ ግዜን፣ከጋጥም ዝክእል ሽግርን ጥቅምታት፣ሚሽጢራዊነት፣ ኣብዚ መፅናዕቲ ናይ ምስታፍ ይኩን ዘይምስታፍ ሙሉእ መሰል ከምዘለኒ ተነጊሩኒ። ስለዝኾነ ኣብዚ መፅናዕቲ ንምስታፍ ተስማዕሚዐ ኣለኩ።

ሀ.እወ ለ. ኣይተስማዕማዕኩን

ናይ ተሳታፊት ፈርማ ---------- ናይ መረጃ ሰብሳቢ ፈርማ----------

ብወላዲ ዝምላእ ናይ ስምምዕነት ፎርሚ

ብዛዕባ እዚ መፅናዕቲ ሓበሬታ ኣብዞም ዝስዕቡ ነጥብታት ማለት እዉን ናይዚ መፅናዕቲ ዋና ዓላማ፣ኣኪያይዳን ዝወስዶ ግዜን፣ከጋጥም ዝክእል ሽግርን ጥቅምታት፣ሚሽጢራዊነት፣ ኣብዚ መፅናዕቲ ናይ ምስታፍ ይኩን ዘይምስታፍ ሙሉእ መሰል ከምዘለኒ ተነጊሩኒ። ብተወሳኪ ኣለይ እንተዘይ ደልያ ኣብ ዝኾነ እዋን ካብቲ መፅናዕቲ ክትወፅእ ከምትክእል ተነጊሩኒ። ስለዝኾነ ኣብዚ መፅናዕቲ ኣለይ ንክትሳተፍ ተስማዕሚዐ ኣለኩ።

ሀ.እወ ለ. ኣይተስማዕማዕኩን

ናይ ወላዲ ፈርማ ---------- ናይ መረጃ ሰብሳቢ ፈርማ----------

ንምትሕብባርኩም ኣዝየ የመስግን

የቕንየለይ

Annexes IV. Tigrigna version of the questionnaire

ሓበሬታ መሰብሰቢ

ናይ ተሳታፊት ኮድ ----------

ናይ ትምህርት ቤት ሽም----------

ታ.ቁ	ሕቶ	መልሲ	ሓበሬታ
	1.ዝስዕቡ ጥያቄታት ስለ ማህበራዊ መስተጋብራት ይመልከቱ		
101	ዕድመኪ ክንደይ እዩ	.....ዓመት	
102	ክንደይ ክፍሊ ኢኪ	————ክፍሊ	
103	ሃይማኖትኪ እንታይ እዩ?	1.ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ካሊእ ይገለፅ_____	
104	መደበኛ እትነብርሉ ከባቢ ኣብይ እዩ?	1. ከተማ 2.ገጠር	
105	ናይ አቦኪ ናይ ትምህርቲ ደረጃ እንታይ እዩ?	1.ምዕሓፍን ምንባብን ዘይክእል 2.ምዕሓፍን ምንባብን ዝክእል 3. ቀዳማይ ብርኪ ዘጠናቀቐ 4. ካልኣይ ብርኪ ዘጠናቀቐ 5. ኮለጅ ሙሩቕን ካብኡ ንላዕልን	
106	ናይ አቦኪ ናይ ስራሕ መደብ እንታይ እዩ?	1. ናይ መንግስቲ ተቐጣሪ 2. ሓረስታይ 3. ናይ መዓልቲ ሰራሕተኛ 4. ነጋዳይ 5. ካሊእ ይገለፅ_____	
107	ናይ እኖኪ ናይ ትምህርቲ ደረጃ እንታይ እዩ?	1.ምዕሓፍን ምንባብን ዘይክእል 2.ምዕሓፍን ምንባብን እትክእል 3. ቀዳማይ ብርኪ ዘጠናቀቐ 4. ካልኣይ ብርኪ ዘጠናቀቐ 5. ናይ ኮለጅ ሙሩቕን ካብኡ ንላዕልን	

108	ናይ እኖኪ ናይ ስራሕ መደብ እንታይ እዩ?	1. ናይ ገዛ እመቤት 2. ናይ መንግስቲ ተቐጣሪ 3. ናይ መዓልቲ ሰራሕተኛ 4. ነጋዲት 5. ካሊእ ይገለፅ_____	
109	ኣብ ሓደ ገዛ እትነብሩ ናይ ቤተሰብ በዝሒ ክንደይ ኢኹም?	.....	
110	ናይ ትምህርት ቤት ዓይነት;	1. ናይ መንግስቲ 2. ናይ ግሊ	
እዞም ዝስዕቡ ጥያቄታት ስለ ኢኮኖሚ ኩነታት ይመልከቱ			
111	ካብዞም ዝስዕቡ ኣብ ገዛኩም ኣለዉ ንእትብልዎም ነገራት ኣሎ ኣብ ገዛኩም ንዘየለዉ ድማ የለን ብምባል መልሲ ሃብሉም -መብራህቲ -ዝሰርሕ ሬድዮ ? -ቴሌቭዝን ? -ናይ ሞባይል ቴሌፎን? - ፍሪጅ? - ዓራት ምስ ፍርናሹ? -ወንበር -ጠረጴዛ -ብሽክለልየታ -መኪና	1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን 1. ኣሎ 2. የለን	
112	ናይ ገዛኩም ምድር ቤት ካብ ምንታይ ተሰሪሑ ?	ሀ. መሬት ለ. ዕንጨይቲ ሐ. ሲሚንቶ መ. ሽክላ/ሴራሚክ	
113	ናይ ገዛኩም ክዳን ካብ ምንታይ ተሰሪሑ ?	ሀ. ካብ ሳዕሪ/ጭቃ ለ.ካብ ቆርቆሮ ሐ.ካብ ሲሚንቶ	
114	ገዛኩም ዝሕረስ መሬት ኣለኩም ዶ?	1. ኣሎ 2. የለን	የለን እትተኽይኑ ናብ 116 ሕለፉ
115	ክንደይ ዝኣክል ኩንታል ብዓመት		

	ተምርቱ	..... ኩንታል	
116	ካብዞም ዝስዕቡ ናይ ገዛ እንስሳ አለው ንትብልዮም ብአሃዝ ግለጹ. ንዘየለው ድማ ባዶ ብምጽሃፍ መልሲ. ሃብሎም ላሕሚ ወይ ብዕራይ ፈረስ፣አድጊ፣በቕሊ ጥየል በጊዕ ደርሆ ንህቢ መራብሂ	..... ላሕሚ ወይ ብዕራይ ..... ፈረስ፣አድጊ፣በቕሊ ..... ጥየል ..... በጊዕ ..... ደርሆ ..... ንህቢ መራብሂ	
2. እዞም ዝስዕቡ ጥያቄታት ስለ ኣመጋግባ ኩነታት ይምልከቱ			
201	መብዛሕትኡ ግዜ ኣብ መዓልቲ ክንደይ ግዜ ምግቢ ትበልዒ?	1.<3 ግዜ 2.≥ 3ግዜ	
202	ብዝሓለፈ ሰሙን ኣብዝኮነ መዓልቲ ቁርሲ ፣ምሳሕ ወይ ድራር ከይበላዕኪ ዶ ትፈልጢ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እትተኮይኑ ናብ 205 ሕለፉ
203	ብዝሓለፈ ሰሙን ኣብዝኮነ መዓልቲ ቁርሲ ፣ምሳሕ ወይ ድራር ዘይበላዕክሉ ምክንያት እንታይ እዩ?	ናይ ምግቢ ሕፅረት 1. እወ 2.ኣይፋሉን ምግቢ ናይ ምብላዕ ድልየት ምቕናስ 1. እወ 2. ኣይፋሉን ብሕማም ምክንያት 1. እወ 2. ኣይፋሉን ክብደት ንምቅናስ ..1.እወ 2.ኣይፉሉን	
204	ንክንደይ ዝኣክል ግዜ ቁርሲ ፣ምሳሕ ወይ ድራር ብዝሓለፈ ሰሙን ዘይበላዕክሉ ?	..... ግዜ	

205	ኣብ ገዛኩም ካብ ኮልዑ መን እዩ ቀዲሙ ዝበልዕ?	1.ጋል ኣንስተይቲ 2.ወዲ ተባዕታይ 3. ብሓባር	
206	እንታይ ዓይነት ምግቢ ብኣብዝሓ እትምገቢ?	1. ዝተረፈ ምግቢ 2. ሓዱሽ ዝተዳለወ ምግቢ	

3 . ኣብ ዝሓለፈ 24 ሰዓት ናይ ዝተመገብክዮም ምግብ ዓይነታት ይምልከቱ

ኣብ ዝስዕብ ክፍቲ ቦታ ተሳታፊት ትማሊ ኣብ ንጉሆ፤ ቀትሪ ኮነ ምሸት፤ ኣብ ገዛ ኮነ ኣብ ደገ ዝተመገበቶም ዝኾነ ዓይነት ምግቢ ዘርዝሪ።

ቁርሲ	መዕንሒ	ምሳሕ	ጠዓሞ	ድራር	መዕንሒ

ተሳታፊት ዝበለዐቶም ምስ ዘርዘረት፤ ካብቶም ቀዕሎም ዝስዕቡ ናይ ምግቢ ጉጅለታት ዘይተጠቀሰ እንተሃልዩ እቲ ዘይተወሰደ ጉጅለ ምግቢ ምውሳዳ ጠይቅያ።

	ሕቶታት	ንኣብነት	1. እወ 2. ኣይፋሉን
301	ሓይሊ ወሃብቲ	ዕፉን፣ ምሸላ፣ ሩዝ፣ ስርናይ፣ጣፍ፣ዳጉሻ ወይ ድማ ከብዚኦም ካብ ዝተዳለወ ምግቢ	
302	ሓምለዋይ ቐዕሊ ዘለዎም ኣሕምልቲ	ቆስጣ ፣ ሓምሊ ኣድሪ	
303	ቫይታሚን ኤ ፍልፍል ዝሾኑ ኣትክልቲ፣ፍራፈረን	ዱባ፣ ካሮት፣ ስካር ድንች፣ ቀይሕ በርበረ፣ማንጎ፣ ፓፓያ	
304	ካልኦት ኣትክልትን ፍራፈረን	ኮሚደረ፣ ቀይሕ ሽንኮርቲ፣ ዓዕዳ ሽንኮርቲ ፣ጥቅልል	

		ጎመን፤ሰላጣ፤ ካልኦት ፍራምረን ከም ኣቮካዶ፤በናና፤ለሚን፤ወይኒ	
305	ኣካል ስጋ	ፀላም ከብዲ፣ ኩላሊት፣ ልቢ፣ ወይ ድማ ደም መሰረቶም ዝኾኑ ምግቢ	
306	ስጋ	ናይ ከፍቲ ስጋ፣ ሓሰማ ፣ ጤል፣ በጊዐ፣ ደርሆ፣ ዓሳ	
307	እንቃቐሑ	ናይ ደርሆ፣ ጅግራ፣ ቐቃሕ	
308	ሰዉነት ሃነፅቲ ዝኾኑ ምግቢታት	ሽምብራ፣ ዓይኒ ዓተር፣ ብርስን፣ዓተር ባሕሪ ወይ ድማ ከብዚኦም ካብ ዝተዳለወ ምግቢ	
309	ፀባን ናይ ፀባ ዉፅኢትን	ፀባ፣ ርግኦ፣ ሕቓን፣ አጅቦ ወይ ድማ ካሊእ ናይ ፀባ ውፂኢት	
		4. እዞም ዝስዕቡ ጥያቄታት ብዛዕባ ናይ ጥዕና ኩነታት የመልክቱ	
401	ኣብ ዝሓለፈ ክልተ ሰሙን አሕሙኺ ይፈልጥ ዶ?	1. እወ 2. ኣየሐመንን	ኣየሐመንን እትተኽይኑ ናብ 501 ሕለፉ
402	ናይዚ ሕማም ዓይነት እንታይ ነይሩ?	ናይ መተንፈሲ ኣካላት ሕማም.... 1. እወ 2.ኣየሐመንን ተቐማጥ/ ታህውኪት..... 1. እወ 2. ኣየሐመንን ቶንሲል.....1. እወ 2. ኣየሐመንን ካሊእ ሕማም.....1. እወ 2. ኣየሐመንን	
		5. እዞም ዝስዕቡ ጥያቄታት ብዛዕባ ናይ ኣካላዊ ምንቅስቃስ ይምልከቱ	
501	ካብ ትምህርተኺ ወፃኢ ብተከታታሊ ን10 ደቂቃ ጠንካራ ኣካል ከንቀሳቅስ ኣብ ዝክእል ስራሕ(ከቢድ ተሸካም፣ምኩዓት) ትሳተፊዶ ?	1. እወ 2. ኣይሰርሕን	ኣይሰርሕን እንተኾይኑናብ504 ሕለፉ

502	ኣብ ቁፅሪ 501 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ ሰሙን ንክንደይ ዝኣክል መዓልቲ ትሰርሒ?	ብመዓልቲ ግለፅዮ_____	
503	ኣብ ቁፅሪ 501 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ መዓልቲ ንክንደይ ዝኣክል ግዜ ትሰርሒ?	ብሰዓት ወይከዓ ብደቂቃ ግለፅዮ	
504	ካብ ትምህርትኪ ወፃኢ ብተከታታሊን10ደቂቃ መጠነኛ ክሳብ ዝለዓለ ኣካል ከንቀሳቅስ ኣብ ዝክእል ስራሕ(ቀሊል ተሸካም)ትሳተፊዶ?	1. እወ 2. ኣይሰርሕን	ኣይሰርሕን እንተኾይኑናብ507 ሕለፊ
505	ኣብ ቁፅሪ 504 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ ሰሙን ንክንደይ ዝኣክል መዓልቲ ትሰርሒ?	ብመዓልቲ ግለፅዮ_____	
506	ኣብ ቁፅሪ 504 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ መዓልቲ ንክንደይ ዝኣክል ግዜ ትሰርሒ?	ብሰዓት ወይከዓ ብደቂቃ ግለፅዮ	
507	ንተከታታሊ ግዜ እንተነኣሰ ን30ደቂቃካብ ቦታ ናብ ቦታ ንምንቅስቃስ ብእግርኪ ወይ ከዓ ሳይክል ትጥቀሚ ዶ?	1. እወ 2. ኣይሰርሕን	ኣይሰርሕን እንተኾይኑ ናብ 510 ሕለፊ
508	ኣብ ቁፅሪ 507 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ ሰሙን ንክንደይ ዝኣክል ግዜ ትጥቀሚ?	ብመዓልቲ ግለፅዮ_____	
509	ኣብ ቁፅሪ 507 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ መዓልቲ ንክንደይ ዝኣክል ግዜ ትጥቀሚ?	ብሰዓት ወይከዓ ብደቂቃ ግለፅዮ	
510	ንተከታታሊ ግዜ እንተነኣሰ ን10 ደቂቃ ጠንካራ ዝኾነ እስፖርቲ(ጉያ፤ኩዕሶ እግሪ)ትሰርሒ ዶ?	1. እወ 2. ኣይሰርሕን	ኣይሰርሕን እንተኾይኑናብ513 ሕለፊ
511	ኣብ ቁፅሪ 510 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ ሰሙን ንክንደይ ዝኣክል ግዜ ትሰርሒ?	ብመዓልቲ ግለፅዮ_____	
512	ኣብ ቁፅሪ 510 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ መዓልቲ ንክንደይ ዝኣክል ግዜ ትሰርሒ?	ብሰዓት ወይከዓ ብደቂቃ ግለፅዮ	
513	ንተከታታሊ ግዜ እንተነኣሰ ን10 ደቂቃ መጠነኛ ክሳብ ዝላዓለ ዝኾነ እስፖርቲ (ሳይክል ምንዳሕ፤ምሕማስ፤ናይ ኢድ ኩዕሾ)ትሰርሒ ዶ?	1. እወ 2. ኣይሰርሕን	ኣይሰርሕን እንተኾይኑናብ516 ሕለፊ

514	ኣብ ቁፅሪ 513 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ ሰሙን ንክንደይ ዝኣክል ግዜ ትሰርሒ?	ብመዓልቲ ግለፅዮ_____	
515	ኣብ ቁፅሪ 513 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ኣብ መዓልቲ ንክንደይ ዝኣክል ግዜ ትሰርሒ?	ብሰዓት ወይከዓ ብደቂቃ ግለፅዮ _____	
516	ኣብ ሓደ መዓልቲ ንክንደይ ዝኣክል ግዜ ኮፍ ኢልኪ(ብመፅናፅቲ፣ፊልሚ ብምርኣይ ወዘተ) ተሕልፊ?	ብሰዓት ወይከዓ ብደቂቃ ግለዮ _____	

6. እዞም ዝስዕቡ ጥያቄታት ብዛዕባ ናይ ኣካባቢ ኩነታት ይምልከቱ			
601	ኣብ ገዛ ዝስተ ማይ ካበይ ትረክቡ?	1. ካብ ናይ ገዛ ቡንባ 2. ካብ ናይ ህዝቢ ቡንባ 3. ካብ ንፅህንኡ ዝተሓለወ ምንጪ 4. ካብ ንፅህንኡ ዘይተሓለወ ጉድጋድ 5. ካብ ንፅህንኡ ዘይተሓለወ ምንጪ	
602	ኣብ ገዛኩም ዝስተ ማይ ንምሕካም ትገብርዎ ነገር ኣሎ ዶ?	1.እወ 2.የለን 3.አይፈለጥኩን	
603	ናይ ገደና ኣትክልቲ (ኣሕምልቲ ን/ወይ ፍራፍረን) ኣለኩምዶ?	1. እወ 2. የብልናን	የብልናን እትተከይኑ ናብ605 ሕለፉ
604	ንምንታይ ዓላማ ኢኩም ናይ ገደና ኣትክልቲ እትትቀምሉ?	1. ንመሸጣ 2. ንባዕልና ክንጥቀመሉ 3. ንመሸጣን ንባዕልና ክንጥቀመሉን	
605	ኣብ ገዛኩም ዓይኒ ምድሪ ኣለኩምዶ?	1. እወ 2. የብልናን	የብልናን እትተከይኑ ናብ607 ሕለፉ

606	እንታይ ዓይነት ዓይኒ ምድሪ እዩ ኣብ ገዛኩም ዘለኩም?	1. ማይ ዝውሰከሉ ሽንት ቤት 2. ማይ ዘይውሰኮ መርገጺ ዘለዎ ሽንት ቤት 3. ማይ ዘይውሰኮ መርገጺ ዘይብሉ ሽንት ቤት 4. ካሊእ እንተሃሊ ይገለጽ	
607	ኣብ ገዛኩም ዓይኒ ምድሪ ዘየለ እንተኮይኑ ኣበይ ትጥቀሙ?	1. ኣብ ገደና 2.ኣብ ናይ ህዝቢ ዓይኒ ምድሪ	
608	ኣብ ትምህርት ቤት እንታይ ዓይነት ዓይኒ ምድሪ ኣለኩም?	1.ማይ ዝውሰከሉ ሽንት ቤት 2. ማይ ዘይውሰኮ ሽንት ቤት 3. ሽንት ቤት የብልናን/ኣብ ገደና	

7. እዞም ዝስዕቡ ጥያቄታት ብዛዕባ ናይ ጥዕናን ስለ ምግቢን ሓበሬታ ምርካብ ይምልከቱ

701	መራከብቲ ሓፉሽ ዶ ትከታተሊ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እንተኮይኑ ናብ 703 ሕለፉ
702	ኣብ ሰሙን ክንደይ ግዜ መራከብቲ ሓፉሽ ትከታተሊ ?	ሬድዮ .....ግዜ ቴሌቪዥን .....ግዜ ጋዜጣ ..... ግዜ መጺሄት ..... ግዜ	
703	ብዛዕባ ጎራዙ ደቂ ኣንስትዮ ኣመጋግባ ሓበሬታ ትረክቢ ዶ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እንተኮይኑ ናብ 801 ሕለፉ

705	ኣብ ቁዕሪ 704 ንዘሎ ጥያቄ መልስኪ እወ እንተኾይኑ ሓበሬታ ካበይ ትረክቢ?	ካብ ትምህርቲ ቤት .....1.እወ 2.ኣይፋሉን ካብ መራከብቲ ሓፉሽ(ሬድዮ፣ ቴሌቪዥን፣ጋዜጣ፣መጺሄት..1.እወ 2.ኣይፋሉን ካብ ጥዕና ባዓል ሞያ....1.እወ 2. ኣይፋሉን	
8. እዞም ዝስዕቡ ጥያቄታት ብዛዕባ ናይ ወርሓዊ ዕጊያ ዑደት የመልክቱ			
801	ወርሓዊ ዕጊያ ጀሚርኪ ዶ?	1. እወ 2. ኣይጀመርኩን	ኣይጀመርኩን እትተኮይኑ ናብ 901 ሕለፊ
802	ወርሓዊ ዕጊያ ኣብ ክንደይ ዓመትኪ ጀሚርኪ?	.....ዓመት	
9. እዞም ዝስዕቡ ጥያቄታት ብዛዕባ ናይ ሰውነት ክብደትን ቁመትን ስርዓት ምዕቃን የመልክቱ			
901	ቁመት	..... ሴንት ሜትር	
902	ክብደት	..... ኪሎግራም	

የቅንየለይ

ናይ ሓበሬታ ሰብሳቢ ሽም----------
ፊርማ----------

Annex V: declaration

I the undersigned, senior applied human nutrition student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Science in applied human nutrition.

Name: Tsgehana G/gyorgis Signature: _____

Place of submission: institute of public health, college of medicine and health sciences, university of Gondar.

Date of submission: _____

This thesis work has been submitted for examination with my/ our approval as university advisor(s).

Advisors:

Name Signature

1. _____ _____

2. _____ _____